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**Understanding the growth of doped ceria thin films**Sigelinde Van Steenberge<sup>1</sup>, Wouter Leroy<sup>1</sup>, Diederik Depla<sup>1</sup><sup>1</sup>Ghent University, Gent, Belgium

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Solid state electrolytes are materials which are electrically conductive due to the presence of mobile ions acting as charge carrier. The charge carrier can be a cation (such as  $H^+$ ,  $Li^+$ ,  $Ag^+$ ) or an anion (such as  $F^-$  and  $O^{2-}$ ). This work focuses on doped cerium oxide ( $Ce(M)O_2$ ) which is an oxygen ion conducting fluorite-structured electrolyte and is used in several applications such as Solid Oxide Fuel Cells (SOFC). As its growth process is not understood yet, this complex oxide material is chosen as a model material to investigate the compositional and structural effects when Ce is replaced by another element ( $Ce(M)O_2$  with  $M = Y$ ). Since most of the literature data concerning this kind of material is related to bulk material and thick films, thin films of yttria doped  $CeO_2$  are deposited via dual magnetron reactive sputtering. By use of this technique, the elemental composition of the doped thin films can be varied in a flexible way. Modifying the thin film morphology and texture is attained by varying the deposition conditions. X-Ray Photoelectron Spectroscopy (XPS) and Energy Dispersive Spectroscopy (EDS) are employed to determine the elemental composition of the deposited films. The thin film crystallinity is characterized using  $\theta$ - $2\theta$  measurements and pole figures.

**Keywords**

SOFC

Cerium Oxide

Thin Film Growth

Magnetron Sputtering